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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/581,663 | 08/03/2000 | VOLKER BECKER | 10191/1466 | 4295 |
| 26646 | 7590 | 12/21/2001 | | |
| KENYON & KENYON ONE BROADWAY NEW YORK, NY 10004 | | | EXAMINER | |
| | | | AHMED, SHAMIM | |
| ART UNIT | | PAPER NUMBER | | |
| 1746 | | 7 | | |
| DATE MAILED: 12/21/2001 | | | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

MEE 7

| | | |
|------------------------------|--------------------------|------------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 09/581,663 | BECKER ET AL. |
| | Examiner Shamim Ahmed | Art Unit 1746 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 03 August 2000.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-10, 13, 14, 23 and 24 is/are rejected.
- 7) Claim(s) 11, 12, 15-22 and 25-31 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ . |
| 2) <input checked="" type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ . | 6) <input type="checkbox"/> Other: _____ . |

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: Specification contains trademark such as "Teflon-like" (see page 6,10,12,15,16,19). The word "Teflon" should be capitalized in the specification.

At page 28, line 20, "Figure 6" should be deleted from the abstract.

Appropriate correction is required.

Claim Objections

1. Claims 5,7 and 27 are objected to because of the following informalities:
 - In claim 5, lines 5-7, includes an improper Markush language.
 - In claim 7, line 4, includes an improper Markush language.
 - In claim 27, line 3-4, includes an improper Markush language. It should says "Is selected from the group consisting of silicon, polysilicon, epitopolysilicon and doped polysilicon".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. In claim 1, line 7-9, the phrase "buried between the first silicon layer and a further silicon layer is at least one separating layer" is confusing. It should be written as "at least one separating layer is buried between the first silicon and a further silicon layer".

In claim 1, lines 9-10, the phrase "upon reaching which, the first etching process comes at least almost to a standstill;" raises a question where the first etching process stop? Is the first etching process stop at least one separating layer? It could be written as " upon reaching al least one separating layer, the first etching process comes almost to a standstill".

4. Claims 3,10 and 24-25 contain the trademark/trade name "Teflon-like". Where a trademark or trade name is used in a claim as a limitation to identify or describe a particular material or product, the claim does not comply with the requirements of 35 U.S.C. 112, second paragraph. See *Ex parte Simpson*, 218 USPQ 1020 (Bd. App. 1982). The claim scope is uncertain since the trademark or trade name cannot be used properly to identify any particular material or product. A trademark or trade name is used to identify a source of goods, and not the goods themselves. Thus, a trademark or trade name does not identify or describe the goods associated with the trademark or trade name. In the present case, the trademark/trade name is used to identify/describe the polymer material and, accordingly, the identification/description is indefinite.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-2,4-9,13-14,23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujii et al (5,313,836) in view of Wolf (Silicon Processing For the VLSI ERA).

Fujii et al disclose a method for manufacturing a semiconductor sensor, wherein a silicon substrate is etched to form trenches using silicon oxide as a mask. Fujii et al also disclose that separating layers (108,104) are etched in a second etching process and finally a third etching is performed to etch a further silicon layer to form a free-standing structure (col.6, lines 37-51 and figures 3G-3H). Fujii et al fail to teach the etching using a dry chemical treatment such as plasma etching instead of a wet etching.

However, Wolf et al teach that dry etching has important manufacturing advantage of eliminating handling, consumption and disposal of relatively large quantities of dangerous acids and solvent used in wet etching (page 539). Wolf et al also teach that etching gas can be used SF₆ or CF₄ and occasionally oxygen can be added to increase the etching rate of silicon (see table on page 546 and pages 549).

It would have been obvious to one skill in the art to replace Fujii et al's wet etching with a dry etching process for eliminating handling, consumption and disposal of relatively

large quantities of dangerous acids and solvent used in wet etching as taught by Wolf et al.

7. Claims 3, 10 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujii et al in view of Wolf et al as applied to claim 1 above, and further in view of Tang et al (6,211,092).

Fujii et al in view of Wolf et al discussed above in paragraph 5 but fail to teach the introduction of a polymer forming monomer into the etching process. It is known in the art that any fluoro or chloro carbon -containing etching gas will form polymer in the side-wall of the trench. In addition, Tang et al disclose an etching process, wherein a polymer forming gas such as C₄F₈ is introduced for etch selectivity (col.5, lines 55-65 and col.6, lines 6-15) and also for providing side-wall passivation and thereby reducing bowing of the via hole or the trench (col.9, lines 52-59). As to claim 24, Tang et al teach that oxygen interacts with the carbon of the polymer to form volatile carbon monoxide, which is eventually removed from the etching chamber and also teach that oxygen plasma can be used to efficiently remove polymer material (col.10, lines 9-13). So, Tang et al teach that oxygen plasma will remove both the mask and the polymer material. Therefore, it would have been obvious to one skill in the art to combine Tang et al's teaching into Fujii et al's modified method to increase the etch selectivity and also to reduce bowing of the trenches as taught by Tang et al.

Allowable Subject Matter

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8. Claims 11-12,15-22,25-31 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter: the prior art does not teach or suggest the introduction of a third separating layer and also does not teach the formation of a conductive layer in such a way that the conductive layer is completely enclosed by the first and the second separating layer.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Okudaira et al (4,330,3840) disclose a process for plasma etching for silicon substrate using sulfur hexafluoride with admixed oxygen; Miyashita et al (5,683,908) disclose a process wherein trench is produced having polymer layer formed on the side wall of the trench and also teach the removing step of the polymer.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shamim Ahmed whose telephone number is (703) 305-1929. The examiner can normally be reached on M-Thu (7:00-5:30) Every Friday Off.

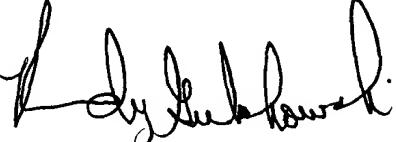
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on (703) 308-4333. The fax phone numbers for the organization where this application or proceeding is assigned are (703)-305-7718 for regular communications and (703) 872-9311 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

SA
December 13, 2001



RANDY GULAKOWSKI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700